

REMARKS

Applicants respectfully request entry of the amendment and reconsideration of the claims. Claims 1–36 are currently pending. Claim 1 has been amended. Applicants submit the amendment is supported throughout the specification, including for example at paragraph 3 on page 9 of the specification and claim 14 as originally filed, and does not introduce new matter.

Examiner Interview

On November 18, 2010, Applicants' representatives Brian Batzli (Reg. No. 32,960) and Anneliese Mayer (Reg. No. 54,434), and Applicants' Australian patent attorneys Janelle Borham and Jacquie Satchell, contacted Examiner Stadler by telephone to discuss the application. On November 17, 2010, Applicants' Representative Anneliese Mayer faxed the Examiner a MEAB article entitled "Solvent Extraction Principles" and a MEAB article entitled "Solvent Extraction Research" to be discussed during the interview. A summary of the general principles of solvent extraction processes that were discussed is provided below. Claim 1 and the references cited in the §103(a) rejections were discussed in view of the general principles of solvent extraction processes provided in the MEAB articles. The fact that neither the Cheng reference nor the Preston reference discloses chelating oximes was also discussed. No agreement was reached. Applicants thank the Examiner for the opportunity to discuss the application.

Rejections under 35 U.S.C. § 103

In the subject Office Action, the claims have been rejected under 35 U.S.C. § 103(a) as being unpatentable in view of the combinations of references discussed below. As articulated by the Supreme Court, a combination is obvious if it is no more than the predictable use of known elements according to their established functions; and there is a reason to combine the known elements. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007). To make a *prima facie* case of obviousness, "it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed." *Id.* A "reasonable

expectation of success" is the standard with which obviousness is determined. MPEP § 2141; *Hodosh v. Block Drug Co.*, 786 F.2d 182, 187 n.5 (Fed. Cir. 1986). Therefore, an understanding of the general principles of solvent extraction processes is necessary in order to determine whether the combinations of references cited in the Office Action satisfy the "reasonable expectation of success" standard.

Solvent extraction is a process that uses solvent extraction reagents to selectively extract target ions into one phase, while leaving another group of ions, such as impurity ions in the other phase. This allows separation of the target ions from the impurity ions. The process typically involves bringing the identified solvent extraction system into contact with an aqueous solution containing dissolved ions. This aqueous solution generally comes from acid leaching of a mineral ore, and valuable target metal ions may be recovered from the leach solution. Because ions other than the target valuable metal ions are present in the leach solution, the solvent extraction system must be able to selectively separate the ions so as to produce a solution which is enriched in the target metal ion or ions and contains relatively low levels of impurities.

Typically, the target metal ions are extracted into the organic phase, and the impurity ions are retained in the aqueous phase. When the organic phase and aqueous phase are separated, the target metal ions are recovered from the organic phase. Therefore, the solvent extraction reagents used in the solvent extraction process must allow the ions and impurities to be selectively partitioned between the organic and aqueous phases such that the organic phase is enriched in the target metal ions, while remaining relatively free of impurities.

When developing new solvent extraction systems, there are a number of general principles that need to be taken into account by researchers in the field. As the Examiner may recall, these principles were set out in the MEAB articles and generally discussed during the interview on November 18, 2010.

Firstly, the researchers need to identify an extractant, or a combination of extractants, that are capable of causing only those target ions to be dissolved into the organic solution, with any impurity ions remaining in the aqueous solution. Different metal ions will distribute themselves in different ways between the organic and aqueous phases. The relative tendency of one metal species to report to either the organic or aqueous phase is not an "all or nothing" proposition - the

metal ions can be partly in one phase, and partly in the other phase (as shown in Figure 2 of the MEAB article entitled "Solvent Extraction Research). Thus, the "development and optimization of a solvent extraction process involves considerable experimental effort in determining the most suitable conditions" (see the paragraph just above Figure 3 in the MEAB article entitled "Solvent Extraction Research").

The extent to which the metal ion will be partitioned into the organic phase is dependent on the following factors:

- the identity of the solvent extraction system;
- the pH conditions;
- the metal ion concentration;
- the salt concentration;
- the reagent concentration;
- the extraction and stripping kinetics
- the residence time; and
- the temperature.

Several of these factors (pH conditions, the identity of the solvent extraction system, and kinetics) are discussed in more detail below.

pH conditions

In solvent extraction processes, it is important that at the actual pH used in the process a high percentage of the target element present in the leach solution will be extracted into the organic phase with minimal amount of the impurity ions being extracted into the organic phase. The result is that most of the target metal ions will be in the organic phase and most of the impurity ions will be in the aqueous phase.

One of the tools used by researchers in this field to compare the tendency of one metal ion to report to the organic or aqueous phase compared to another metal is the pH at which 50% extraction would take place (known as pH_{50}). This fact is noted in the Preston reference (GB 2109357). By comparing the pH_{50} for different metals in a solvent extraction system, it is possible to determine whether there is a pH at which a solvent extraction system can be operated

so as to extract enough of the target element into the organic phase while the impurity element remains in the aqueous phase. A sufficient difference in the pH_{50} value for base metals (nickel, cobalt, zinc, manganese, copper, etc.) is required to achieve a viable separation of the target elements from rejected or impurity elements. It is generally accepted in this technology field that the difference between the pH_{50} values of the target metal ions to be extracted into the organic phase and the impurity ions which are to remain in the aqueous phase should be at least 1.0 pH unit for a reasonable separation, or 1.5 pH units for a good separation, or >2.0 pH units for excellent separation as far as base metals are concerned. This means that the solvent extraction process can proceed at a pH between the pH_{50} for the target and impurity ions, which will result in most of the target element being extracted into the organic phase and most of the impurity element remaining in the aqueous phase.

If the pH_{50} values of two metal ions which are to be separated from each other are similar values (i.e. the difference between the two pH_{50} values is less than 1.0 pH unit for base metals) then the solvent extraction system is not capable of separating those ions to the degree required for separation. Under such conditions, the solvent extraction system will be unable to extract the target element into the organic phase and retain the impurity element in the aqueous phase in sufficiently high concentrations to effect an acceptable separation.

Identity of solvent extraction system

Another factor which impacts on determining how a metal ion will be partitioned into the organic phase is the identity of the solvent extraction system. It is known in the solvent extraction art that changing the identity of the extractant greatly changes the pH_{50} for each element. Accordingly, it is not possible to change between extractants without significant differences in the pH_{50} for each metal species. For example, the table on page 2 of Preston relates to organophosphoric acid based extractants and shows that very different pH_{50} values are obtained for cobalt and nickel when compared to the pH_{50} values that are obtained using carboxylic acid based extractants as shown in table 4 on page 5 of Preston.

Specifically, the combination of the phosphoric acid extractant with additive 2-ethyl-hexanal oxime (EHO) on page 2 of Preston gives a pH_{50} value for cobalt of 1.99 and a pH_{50} value of 1.58 for nickel. In contrast, the combination of the carboxylic acid Versatic 10 with EHO gives a

pH₅₀ value of 5.28 for cobalt and a pH₅₀ value of 4.66 for nickel (Table 4). These examples show that the identity of the extraction reagents can dramatically alter how metal ions are distributed between the organic and aqueous phases in a solvent extraction process.

In particular, these examples show that phosphoric acid extractants behave very differently to carboxylic acid extractants in terms of their impact on the relative tendency of ions, such as cobalt and nickel, to be extracted into the organic phase (as represented by the pH₅₀ value). Because of this lack of predictability, it is generally accepted in the art that information specific to an organophosphoric acid based extractant and its behaviour is not relevant to a different extractant.

It is also known in the solvent extraction art that the addition of additives can change the pH₅₀ values of the target and impurity ions. The impact of the addition of additives on the pH₅₀ values is shown in Preston. When starting from a phosphoric acid extractant such as di-(2-ethylhexyl) phosphoric acid (D2EHPA), the addition of a second component such as EHO into the extraction system greatly impacts the pH₅₀ values for each metal present in the system. Referring to page 6 in Preston, it can be seen that adding EHO into the extraction system dramatically changes the pH₅₀ values for each metal present. Whilst the pH₅₀ values change, they do not change consistently and/or predictably for each metal ion present. For instance, the addition of EHO causes the pH₅₀ value for nickel to reduce from 4.1 to 1.60 and the pH₅₀ value for manganese to reduce from 2.90 to 2.12, whereas the pH₅₀ value for calcium increases from 2.85 to 2.97. Therefore, the partition of the metal ions between the organic and aqueous phases is completely changed by the addition of a further component to the solvent extraction system and the effect of such further components on the partition of the metal ions between the phases is unpredictable.

Kinetics

Another important principle of solvent extraction is kinetics. Kinetics refers to the speed at which metal ions move from one phase into another. Metal ions do not always immediately transfer from one phase (such as the aqueous phase) into another (such as the organic phase). For some metal ions, this transfer process can only take seconds, while for others, it can take hours. This means that the difference in extraction and stripping kinetics can be significant and have a

large influence on metal separation. The stages of the process where such kinetic factors impact the process include extraction (moving from the aqueous to the organic phase) and stripping (moving from the organic phase to an aqueous strip liquor). Although the metals can be separated thermodynamically based on large pH_{50} value differences, they may not be separated in practice due to slow kinetics. Therefore, for a solvent extraction process to be useful, it should be:

- (i) thermodynamically feasible (i.e. with large pH_{50} value differences between the target metals and the impurities; and
- (ii) kinetically viable (i.e. fast enough kinetics to meet operating requirements).

Within the context of these general principles of solvent extraction processes, the following obviousness rejections are addressed:

(1) Claims 1–4, 6–10, 18–21, 23–26 and 28 were rejected under 35 U.S.C. § 103(a) as unpatentable over Preston (GB 2,109,357) in view of Mihaylov (US 5,447,552). Applicants respectfully traverse the rejection.

Claim 1 as amended recites a process for the separation of nickel, cobalt or both from impurity elements selected from one or more of calcium, magnesium, manganese and chloride contained in a leach solution, wherein the nickel and/or cobalt is extracted into an organic phase and the calcium, magnesium, manganese, and chloride is rejected to the aqueous phase. The steps of the process include contacting the leach solution with a solvent extraction solution that includes a carboxylic acid, a chelating aliphatic hydroxyoxime and a kinetic accelerator. Claims 2–4, 6–10, 10–20, 23–26, and 28 depend directly or indirectly from claim 1 and incorporate all the limitations thereof.

The Office Action has not established a *prima facie* case of obviousness because the cited combination of references does not disclose or suggest all the elements of the claims as amended and teaches away from the claims. Applicants therefore submit the Office Action has failed to establish that one of skill in the art in view of the cited combination of references had a reasonable expectation of successfully arriving at the claims.

(a) Preston teaches away from the use of chelating oximes

It is well established that "a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP § 2141.02 citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983) *cert. denied*, 469 U.S. 851 (1984). A prior art reference that teaches away from the claimed invention is a significant factor to be considered in determining obviousness. *In re Gurley*, 27 F.3d 551, 554 (Fed. Cir. 1994). It is improper to combine references where the references teach away from their combination. MPEP § 2145(X)(D)(2) citing *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983).

Preston does not disclose or suggest that chelating oximes can viably be used with carboxylic acids for the extraction of cobalt in a solvent extraction process. To the contrary, Preston teaches away from use of a chelating oxime (such as the chelating aliphatic hydroxyoxime recited in claim 1) and a carboxylic acid as extractants in a solvent extraction process.

Preston at page 1, lines 59 to 61 states that "*the extraction takes place extremely quickly (of the order of a few minutes, as opposed to some hours in the case of a carboxylic acid and chelating oxime such as LIX 63 mixture)*". The examples provided in Preston use LIX 63 as an additive in an extractant solution with organophosphorus acids, which gives poor results. The examples using carboxylic acids in the extractant solution use only non-chelating oximes as additives (see Table 4, page 5). The section bridging pages 2 and 3 of Preston under the heading "Initial Tests" provides an example using Di-(2-ethyl-hexyl) Phosphoric Acid (0.5M in xylene) as the extractant solution with LIX 63 (0.5M) as an additive. In relation to this combination, Preston states at page 3, lines 1 to 2 that "*extraction of cobalt even is slow and also stripping thereof from the reagent is extremely difficult.*"

In view of the disclosure in Preston which disparages the use of chelating oximes in a process to extract nickel and cobalt, Applicants submit one of skill in the art would understand that LIX 63 and other chelating oximes should be avoided in an extraction where cobalt is desired to be separated from impurities. Based on the teachings in Preston, one of skill in the art would not have reasonably expected a suitable separation with sufficiently fast stripping kinetics

as is required for a viable process because Preston discloses that the extraction of cobalt with a carboxylic acid and chelating oxime is slow and the stripping extremely difficult. Both of these characteristics lead one of skill in the art away from a solvent extraction process that includes carboxylic acid and chelating oxime.

(b) Preston does not disclose or suggest that nickel and/or cobalt are extracted into the organic phase with the impurities into the aqueous phase.

The Office Action alleges Preston discloses a process for the extraction of nickel or cobalt from an aqueous solution, and that these metals can be selectively removed from impurities such as “magnesium”.¹ Claim 1 as amended recites extraction of nickel and/or cobalt into an organic phase, while calcium, magnesium, manganese and chloride are rejected to the aqueous phase. Preston does not disclose or suggest a solvent extraction system that is capable of separating cobalt and nickel from manganese. Instead, in the passage of Preston cited in the Office Action (page 1, lines 8-12 of Preston), it is stated that “[m]etals which are often to be removed and recovered include cobalt, nickel, copper, zinc and manganese which are all amenable to removal by use of a solvent extraction”. Therefore, Preston discloses that cobalt, nickel and manganese are extracted together, rather than cobalt and/or nickel being separated from manganese as recited in the claims.

Table 5 on page 6 of Preston shows pH₅₀ values for a number of ions, which were determined using an extractant containing a phosphoric acid (D2EHPA) and a non-chelating oxime (EHO). These values do not suggest that the solvent extraction system disclosed by Preston permits the separation of cobalt and nickel from manganese, since the pH₅₀ values for each of these ions are very similar (i.e. the pH₅₀ value for cobalt is 2.00, the pH₅₀ value for nickel is 1.60 and the pH₅₀ value for manganese is 2.12). Accordingly, it would not have been obvious to a person skilled in the art, based on the teaching of Preston, that the combination of a chelating oxime, a carboxylic acid and a kinetic accelerator could be used to separate cobalt and/or nickel from calcium, manganese, magnesium and chloride.

¹ Applicants assume the Examiner intended to recite “manganese” instead of “magnesium” as the section of Preston cited in the rejection (page 1, lines 8-12) refers to manganese.

(c) Mihaylov does not remedy the deficiencies of Preston

The Office Action asserts that Preston discloses it was known to use TBP as a kinetic accelerator (citing Preston at page 2, table), and that Mihaylov discloses it was known to use TBP when extracting nickel and cobalt in order to avoid oxidation of cobalt (citing Mihaylov at column 2, line 68 to column 3, line 12). In view of these disclosures, the Office Action asserts it would have been obvious to one of ordinary skill in the art to use TBP simultaneously in the extraction process with the oxime and carboxylic acid. Applicants do not agree.

First, Preston does not disclose or suggest the use of kinetic accelerators, or that tri-n-butyl phosphate (TBP) is a kinetic accelerator. Preston never uses the term “kinetic accelerators”. The Applicants in the present application were the first to use this term and define a range of reagents that achieve a kinetic accelerator function in the specifically claimed extraction system. Preston refers to the presence of additives to enhance the utility of extractants, but the aspect of the extraction enhanced is that the pH_{50} values are changed by the addition of the additive. This improves the thermodynamic requirement of the separation and has nothing to do with the kinetics of the separation. No mention of “kinetics” is made in Preston.

The Office Action cites the table on page 2 of Preston as evidence that it was known in the art to use TBP as a “kinetic accelerator”. However, the table on page 2 merely names TBP as an additive, and does not disclose or suggest that TBP is used or functions as a kinetic accelerator. Further, in the table on page 2 of Preston, TBP is used in combination with a phosphonic acid (RD 577), and no oxime is present. Accordingly, Preston does not support the assertion in the Office Action that it would be obvious to use kinetic accelerators, such as TBP, in an extractant system.

Secondly, Preston clearly discloses that a kinetic problem exists with the extraction of nickel into the organic phase in the extraction systems disclosed in Preston and that using a chelating oxime is of little practical use because the extraction of nickel is too slow. See, for example, Preston at page 2 lines 64 and 65, where it is stated that “the extraction of nickel was too slow to be of any practical use”. Preston does not propose or identify any solution to this problem.

Similarly, Mihaylov does not propose any solution to this problem – Mihaylov does not disclose or suggest how to overcome slow extraction and/or stripping kinetics with nickel when using a carboxylic acid extractant and a chelating oxime. Mihaylov states that “once loaded into these chelating oximes, cobalt (II) tends to oxidize to cobalt (III), which adversely affects stripping and may degrade the oxime reagent” (see Mihaylov, at col. 2, ll. 23–26). Mihaylov also notes that the rate for nickel extraction using chelating hydroxyoximes is very slow (see Mihaylov, at col. 2, ll. 26–28). Both Preston and Mihaylov, therefore, disparage the use of chelating oximes in a process to extract cobalt and nickel. Absent Applicants’ disclosure, a person skilled in the art would not have reasonably combined Mihaylov and Preston, because without a solution to the kinetics problem, there would have been no motivation to combine the references as alleged in the Office Action.

The Office Action asserts one of skill in the art would have relied on Mihaylov to modify Preston for the purpose of overcoming an oxidation problem. Applicants strongly disagree.

First, Preston avoided any oxidation problem by using a single non-chelating oxime, so there were no problems with oxidation in Preston.

Secondly, the disclosure in Mihaylov relates to an entirely different extraction system and would not have been considered by one of skill in the art to be combinable with Preston for this reason. As discussed in the enclosed declaration of Dr. Zhaowu Zhu under 37 C.F.R. § 1.132 (hereinafter the Zhu Declaration)², Mihaylov relates to a solvent extraction process using an extractant containing at least one soluble dithiophosphinic acid. See Zhu Declaration at paragraph 11. Mihaylov discloses that tri-butyl-phosphate (TBP) can be used with organothiophosphorus extractants as an oxygen donor reagent to prevent formation of cobalt III by oxidation of cobalt II. As set forth in the Zhu Declaration, this disclosure in Mihaylov is specific to solvent extraction processes using an organothiophosphinic extractant and would not instruct or suggest to an expert in the field, such as himself, use of oxygen donor reagents in any other solvent systems. See Zhu Declaration at paragraph 11.

² Dr. Zhaowu Zhu has a Ph.D. in chemistry and has conducted extensive research in the field of solvent extraction chemistry. Prior to working at CSIRO Process Science and Engineering, Dr. Zhu was the Deputy Director of the Fine Chemical Department at the General Research Institute Non-ferrous Metals (GRINM) in China. See the Zhu Declaration at paragraphs 2 and 3 and the accompanying Curriculum Vitae of Dr. Zhu.

The Zhu Declaration also notes that one of skill in the art in solvent extraction processes recognizes that one can not simply “mix and match” any reagents to prepare a suitable extractant for performing a desired extraction. See Zhu Declaration at paragraph 12. According to the Zhu Declaration, an expert in the field of solvent extraction processes, such as Dr. Zhu himself, would not have combined Mihaylov with Preston as alleged in the Office Action because of the lack of predictability as to how metals will be partitioned when extraction reagents are combined. See Zhu Declaration at paragraph 12.

For example, Mihaylov does not disclose, and it was not known at the time of filing, (1) whether the addition of TBP to a different extraction system (based on carboxylic acid and chelating oxime) would avoid the oxidation problems of cobalt(II) to cobalt(III) and (2) if the addition of TBP would change the pH_{50} values in a way that would prevent the required extraction of cobalt and nickel into the organic phase with the manganese and other impurity ions into the aqueous phase. As discussed above in the summary of general principles of solvent extraction processes and the Zhu Declaration at paragraph 12, the partitioning of metals when extraction reagents are combined is unpredictable.

The addition of further components to an extractant system tends to change the pH_{50} values of the ions, and thus effects the way ions are partitioned between the organic and aqueous phases. A person skilled in the art, therefore, would not have been reasonably motivated to combine Mihaylov with Preston as alleged in the Office Action and would not have a reasonable expectation of successfully arriving at the claims because (1) organothiophosphorous acid extractants are considered by one of skill in the art to be different from phosphoric acid extractants and (2) the metal partitioning effects when combining extraction reagents from different systems is unpredictable.

At page 3 of the Office Action, it is stated that “[t]he references teach the use of the acid, oxime and the accelerator in this process and so it would have been obvious to use them all at the same time during the leach process”. Applicants do not agree.

As discussed above, the behaviour of an extractant in a given solvent extraction process does not predict the behaviour of the same extractant in a different extraction process. As discussed in the Zhu Declaration at paragraph 12, experts in the field recognize that it is not

possible to simply “mix and match” any reagent with any additives to effect a desired separation of ions. Any changes made in this regard can unpredictably change the results of the solvent extraction process, and may no longer result in the desired separation of metals.

In view of the foregoing, Applicants submit the Office Action has failed to provide a *prima facie* case of obviousness. The Preston and Mihaylov references do not disclose or suggest (alone or in combination) all the elements of claim 1 as amended. Moreover, one of skill in the art would not have been reasonably motivated to combine the references as alleged in the Office Action because Preston teaches away from chelating oximes, and the metal partitioning effects when combining extraction reagents from different systems was known to be unpredictable. Accordingly, one of skill in the art would not have had a reasonable expectation of successfully arriving at claim 1 as amended. Applicants respectfully request withdrawal of the rejection.

Claims 2–4, 6–10, 10–20, 23–26 and 28 depend from claim 1 and incorporate all the limitations thereof. Therefore, these claims are not *prima facie* obvious over the combination of Preston and Mihaylov, for substantially the same reasons as indicated above for claim 1. Withdrawal of the rejection with respect to these claims is respectfully requested.

With respect to claim to claim 21, which was rejected over Preston and Mihaylov as applied to the above claims (e.g., at page 6 of the Office Action), Applicants submit the claim depends from claim 1 and is not *prima facie* obvious over the combination of Preston and Mihaylov, for substantially the same reasons as indicated above for claim 1. Withdrawal of the rejection with respect to claim 21 is respectfully requested.

(2) Claims 1, 2, 4–7, 14–17, 22, 23, 26, 27, 30, 31 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng (WO 02/22896) in view of Mihaylov. Applicants respectfully traverse the rejection.

The Office Action asserts Cheng discloses the use of a carboxylic acid, a synergist, and an oxime, particularly a non-chelating oxime. Applicants do not agree.

Contrary to the assertions in the Office Action, Cheng does not disclose the use of three agents. As discussed in the Zhu Declaration, Cheng only discloses the use of a carboxylic acid

and a synergist. See Zhu Declaration at paragraph 10. One example of the synergist is a non-chelating oxime. Cheng never discloses the use of this particular synergist in the process, and discloses a preference for another type of synergist, which is not an oxime and does not display the same properties as the claimed chelating oximes.

The Office Action asserts at page 4 that it would have been obvious to one of skill in the art to combine Mihaylov with Cheng because Mihaylov discloses that TBP is beneficial to avoid oxidation. Applicants do not agree.

As discussed above and in the Zhu Declaration at paragraph 11, the disclosure in Mihaylov relating to TBP is specific to the combination of TBP with organothiophosphorus acid extractant. Moreover, neither Mihaylov nor Cheng together disclose the use of a chelating oxime, as is required in amended claim 1. Mihaylov does not teach that TBP should be used in a process that contains an oxime, and only discloses that TBP avoids oxidation of cobalt(II) to cobalt(III) when used with an organothiophosphorous acid.

Regarding the use of chelating oximes, Mihaylov states that “once loaded into these chelating oximes, cobalt (II) tends to oxidize to cobalt (III), which adversely affects stripping and may degrade the oxime reagent” (see Mihaylov, at col. 2, ll. 23–26). Mihaylov also notes that the rate for nickel extraction using chelating hydroxyoximes is very slow (see Mihaylov, at col. 2, ll. 26–28). Mihaylov, therefore, disparages the use of chelating oximes in combination with TBP in a process to extract cobalt and nickel.

As discussed above, the behaviour of an extractant in a given solvent extraction process does not predict the behaviour of the same extractant in a different extraction process. Further, the Zhu Declaration at paragraph 12 states that experts in the field recognize that it is not possible to simply “mix and match” any reagent with any additives to effect a desired separation of ions. Any changes made in this regard can unpredictably change the results of the solvent extraction process, and may no longer result in the desired separation of metals. According to Dr. Zhu, an expert in the field of solvent extraction processes, such as himself, would not have combined Mihaylov with Cheng as alleged in the Office Action because of the lack of predictability as to how metals will be partitioned when extraction reagents are combined. See Zhu Declaration at paragraph 12.

In view of the foregoing, Applicants submit the Office Action has failed to provide a *prima facie* case of obviousness. The combination of Cheng and Mihaylov does not disclose or suggest all the elements of claim 1 as amended. Moreover, one of skill in the art would not have been reasonably motivated to combine the references as alleged in the Office Action because Mihaylov disparages the use of chelating oximes in a process to extract cobalt and nickel and the metal partitioning effects when combining extraction reagents from different systems was known to be unpredictable. Accordingly, one of skill in the art would not have had a reasonable expectation of successfully arriving at claim 1 as amended. Applicants respectfully request withdrawal of the rejection.

Claims 2, 4-7, 14, 15, 16, 22, 23, 26, 27, 30, 31 and 36 depend from claim 1 and incorporate all the limitations thereof. Therefore, these claims are not *prima facie* obvious over the combination of Cheng and Mihaylov, for substantially the same reasons as indicated above for claim 1. Withdrawal of the rejection with respect to these claims is respectfully requested.

With respect to claim 17, which was rejected over Cheng and Mihaylov as applied to the above claims (e.g., at page 6 of the Office Action), Applicants submit the claim depends from claim 1 and is not *prima facie* obvious over the combination of Cheng and Mihaylov, for substantially the same reasons as indicated above for claim 1. Withdrawal of the rejection with respect to claim 17 is respectfully requested.

(3) Claims 11-13 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Preston in view of Mihaylov and further in view of Davis (US 4,104,359). Applicants respectfully traverse the rejection.

Claims 11-13 and 18 depend directly or indirectly from claim 1. The combination of Preston and Mihaylov does not render claim 1 unpatentable for the reasons discussed above. The discussion of Preston and Mihaylov as applied to claim 1 above is fully incorporated herein to avoid duplication.

The deficiencies of Preston and Mihaylov are not cured by Davis. More specifically, Davis does not disclose or suggest using an acid, a kinetic accelerator and a chelating oxime together in the described process. Therefore, the disclosure in Davis would not have motivated a

person of skill in the art to modify the process disclosed in Preston and Mihaylov to successfully arrive at the method of the present claims. Accordingly, Claims 11–13 and 18 are therefore not *prima facie* obvious, and the rejection over Preston, Mihaylov and Davis under 35 U.S.C. § 103 should be withdrawn.

In view of the foregoing, reconsideration and withdrawal of the rejection is respectfully requested.

(4) Claims 29 and 32–35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of Mihaylov and further in view of Hummelstedt (US 4,120,817). Applicants respectfully traverse the rejection.

Claims 29 and 32–35 depend directly or indirectly from claim 1. The combination of Cheng and Mihaylov does not render claim 1 unpatentable for the reasons discussed above. The discussion of Cheng and Mihaylov as applied to claim 1 above is fully incorporated herein to avoid duplication.

The deficiencies of Cheng and Mihaylov are not cured by Hummelstedt. More specifically, Hummelstedt does not disclose or suggest using an acid, a kinetic accelerator and a chelating oxime together in the described process. Therefore, the disclosure in Hummelstedt would not have motivated a person of skill in the art to modify the process disclosed in Cheng and Mihaylov to successfully arrive at the method of the present claims. Claims 29, 32 and 33–35 are therefore not *prima facie* obvious, and the rejection over Cheng, Mihaylov and Hummelstedt under 35 U.S.C. § 103 should be withdrawn.

In view of the foregoing, reconsideration and withdrawal of the rejection is respectfully requested.

SUMMARY

In view of the above amendments and remarks, Applicants respectfully request a Notice of Allowance. Applicants do not otherwise concede the correctness of the Examiner's rejections and/or characterization of the cited art, and Applicants specifically reserve the right to make additional arguments as may be necessary.

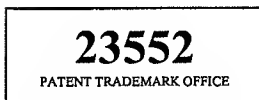
U.S. Patent Application Serial No. 10/588,116

Amendment dated January 6, 2011

Reply to Final Office Action of July 6, 2010

If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

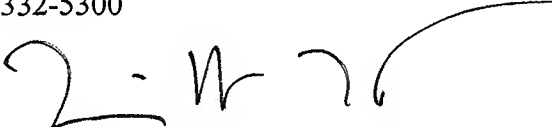
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